Pediatric Rhythm Disturbances for the EMS Provider

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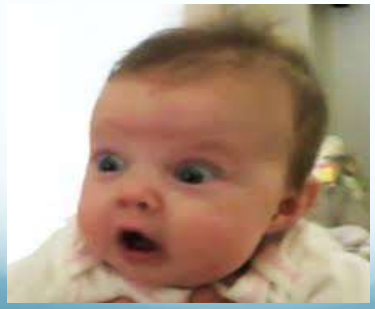
You are toned out for Pediatric arrest….



Objectives

- To identify the 3 main rhythm categories in pediatrics
  - Tachy-dysrhythmias
  - Brady-dysrhythmias
  - Pulseless arrest rhythms
- Identify key assessment and treatment factors for each

Pediatric Cardiac Rhythms Only 3 Choices….

- Too *FAST*
  - Sinus Tach
  - Tachydysrhythmia
- Too S L O W
  - Sinus brady
  - Heart block
- Pulseless
  - Asystole
  - PEA
  - VF/pVT

Approaching Assessment

The approaching assessment / PAT determines your initial hands on assessment.

Is it *immediately* life threatening? → *C A B*
Or not? → *A B C*

CAB (apneic)
- Check a Pulse/Cardio
- Check Airway
- Check Breathing

A B C (breathing)
- Airway
- Breathing
- Cardiovascular

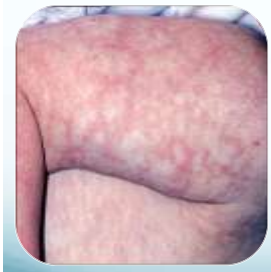
If the child is breathing: A B C

- Once you have started your cardiovascular assessment:

Its All About Perfusion

- Hands on!
  - Skin temp
  - CRT
  - Pulse comparison
- CV VS
  - HR
  - ? BP
  - Temperature
- LOC

Color / Circulation



Once you get to the Pulse Check:

- Too *FAST*
  - Tachydysrhythmias- SVT, AF/F, VT
  - Sinus Tachycardia
- Too S L O W
  - Bradydysrhythmias- SB, AVB

Too *FAST*

- Tachycardia:
  - Relative- too fast for child's level of activity and clinical condition
    - Sinus tach- SA node faster than normal
- Tachy-dysrhythmias:
  - Conduction system issue
    - SVT, VT, AF/AF

Sinus Tachycardia

- Normal response to possibly abnormal problem.
- Fever, pain, hypovolemia, medications
- Instability if from underlying issue, not necessarily from the rhythm

SINUS TACHYCARDIA MAY THE FIRST SIGN SHOCK IN THE PEDIATRIC PATIENT

Pulse: WAY Too *Fast*

- Rate > 220 Infant,>180 child
- QRS: Narrow= < .09
- Regular
- P waves absent or abnormal
- May be episodic

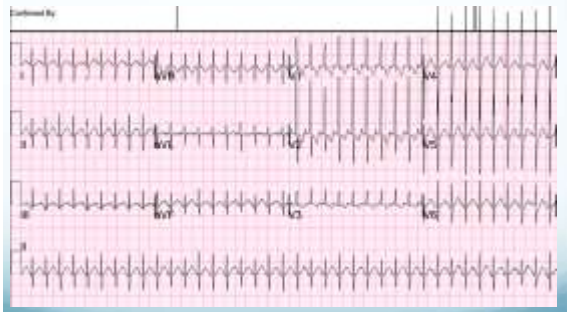
- ***S**upra **V**entricular **T**achycardia*

*Supra**V**entricular **T**achycardia*

- Accessory Pathway Reentry
  - Abnormal circuit between atria and vents
- AV Nodal Reentry
  - Dual pathway within the AV node
- Ectopic Atrial Focus
  - Ectopic focus in atria, esp post op,
    - If in AV node: JET

SVT

- Stable- LOC WNL
- Unstable- AMS, ↓ LOC, s/s - CHF



SVT

- **Stable**
  - Monitor, IV, O2, NPO
  - Transfer/ transport, ? Consult
  - Vagal
  - Adenosine

SVT - *Unstable*

- **Medication**

  Adenosine 0.1mg/ kg (max 1st dose-6mg)

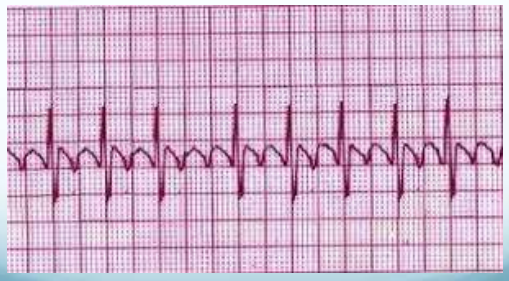
If IV/ IO already in place

- **Electricity**-Synchronized Cardioversion 0.5-1j/kg (↑to 2j/kg if not effective)

If no IV/IO or if adenosine ineffective

Atrial Flutter

- Newborns
- CHD, esp post op
- < .09, variable AV conduction
- Atrial rate can be > 300 min, ventricular response slower, and can be irregular
- Classic "saw tooth" pattern

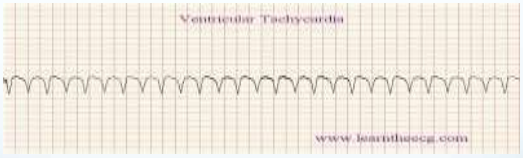


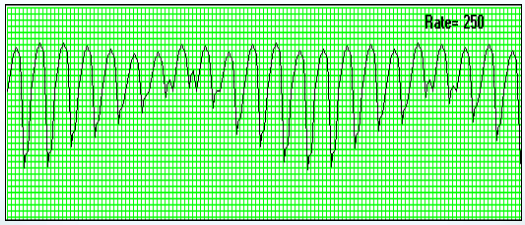
Ventricular Tachycardia- w/Pulse

- Wide QRS QRS > .09 and patient *STABLE*:
  - Consider Adenosine if regular and monomorphic
  - EXPERT CONSULTATION
    - Amiodarone **OR** Lidocaine **OR** Procainamide

UNSTABLE:

- *synchronized* cardiovert- 0.5-1j/kg. If unsuccessful, consider 6 H's 5 T's (?Toxins?)





Wide Complex Tachycardia- *Torsades De Points*- Polymorphic VT

- Congenital
- Toxidromes
  - Type I anti-arrhythmics (Procainamide, quindidine)
  - Type III anti-arrhythmics (sotalol, amiodarone)
  - TCA's
- TREATMENT:
  - ABC's
  - MAGNESIUM!!
  - ? Lidocaine

Too S L O W Brady-dysrhythmias

- Sinus Brady
- Sinus Arrest, resulting in:
  - AV Blocks
  - Junctional rhythm
  - Ventricular escape rhythm

Too S L O W- Brady-dysrhythmias

HR slower than normal for pt age

- Primary- CHD, acquired HD- cardiomyopathy, myocarditis , conduction abnormalities or damage
- Secondary- results from conditions that alter normal function (hypoxia, acidosis, hypothermia, hypotension, etc)

AV Blocks:

- **First degree**- prolonged PR- if seen in ingestions: BEWARE
- **Second Degree**
  - Mobitz Type I- Wenchebach
    - Rx, □in parasympathetic tone, MI
  - Mobitz Type II-
    - Lesions in conduction pathway, some Rx, ACS
- **Third Degree/ Complete**
  - Conduction system damage, MI, congenital block, myocarditis, Rx, □in parasympathetic tone

Brady-dysrhythmias-

Stable or *Unstable?*

- Unstable:
  - Shock like perfusion
  - Sudden collapse
  - Hypotension

BradyDysrhythmias

- C A B ! If patient looks compromised- & HR < 60
  - CPR- always if HR <60 & poor perfusion
  - Epinephrine
  - Atropine- give 1st in AV blocks, myocarditis, cardiomyopathy
  - Pacing- esp CHD

Pulseless Arrest

Pulseless Arrest

Two Presentations:

Asphyxial Arrest

- Respiratory Failure> Cardiopulmonary Failure
- Hypotensive Shock > Cardiopulmonary Failure

Sudden Cardiac Arrest

- Cardiac etiology

Pulseless Arrest

- 3 Types:
  - Asystole
  - PEA
  - VF/ Pulseless VT
- 2 Types of treatment:
  - Not shockable (PEA, Asystole)
  - Shockable (VF/ pulseless VT)
    - All get EPI as first line Rx.....

CPR

- Good compressions
  - Compression pulse
  - ETCO2
  - Aline
- Do Not Overventilate
  - Decreased venous return
  - Over-inflation of stomach

EPINEPHRINE

1:10,000
DOSE: 0.01mg/kg = VOLUME 0.1cc/kg
A pediatric DOSE will always
Start with a decimal point!!!

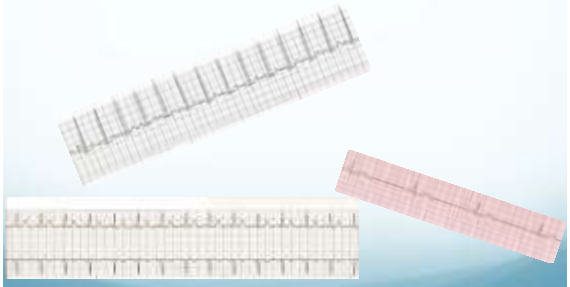
Pulseless Arrest Asystole

- Tx:
  - CPR
  - EPI q 3-5 mins

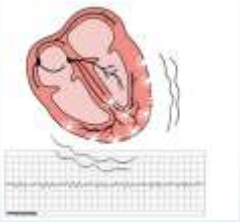
PEA - EMD

- CPR
- Epinephrine
- 6 H's hypovolemia, hypoxia, hypo-hyperkalemia,Hydrogen ion (acidosis), hypoglycemia, HYPOTHERMIA,
- 5 T's
  - Toxins
  - Tamponade
  - Tension pneumo
  - Thrombosis
  - Trauma

PEA

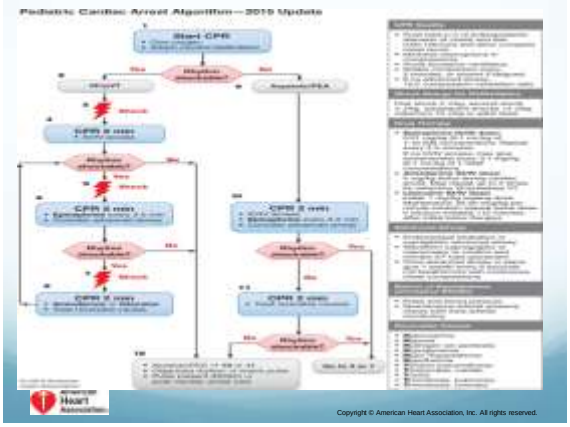


Ventricular Fibrillation
Pulseless VT



Ventricular Fibrillation/ pVT

Tx: DEFIB! (CPR till defib arrives)
2-4j/kg
CPR- 2minutes, continue through charging
4j +/ kg
CPR- 2 minutes
Epinephrine (as soon as ready & q 3-5 mins)
CPR -2 minutes
4+ j/ Kg
CPR- 2minutes
Antiarhythmic



2015 AHA Updates

- Compression depth still inadequate
- Lidocaine OR amino for pVT, unstable VT
- Normothermia post ROSC

Case Scenario #1

- Called to a residence c/c infant" not breathing right"
- AOSTF: Mom states the baby has had vomiting and diarrhea for 2 days. Infant is quietly laying in crib..
- Approaching assessment:
  - Infant is pale/ grey
  - Gasping
  - lethargic

C A B

- **C**irculation: Pale, cool skin, bradycardic with weak central, no distal pulses
- **A**irway: Patent
- **B**reathing: Ineffective

Physiologic status?

Cardiopulmonary Failure

- C- Pt is bradycardiac and poorly perfused
  - START CHEST COMPRESSIONS!
- A
  - Second HCP: open airway and begin….
- B
  - BVM 15:2 with 100%

Pulses return after brief CPR……..

- Now, switching to ABC assessment:
  - Pt is allowing BVM (LOC??)
    - BVM (often) = Emesis… prepare for it….
  - BBS clear and = (rate of ventilation with ROSC?)
  - HR 180, CRT > 4 sec's, cool from knees down

Physiologic status now?
Priorities?

Case Study #2

- Called to residence of an infant who won't take his bottle
- AOSTF:
  - Pale
  - Tachypneic
  - Lethargic

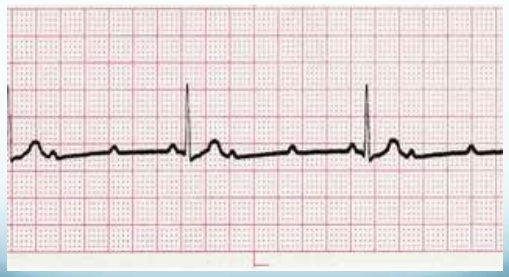
A B C

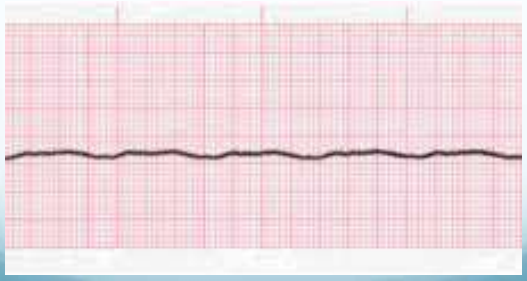
- Airway- patent
- Breathing
  - BBS
  - RR
  - WOB
- Circulation
  - Temp
  - CRT
  - Pulses

SVT

- Stable? Unstable?
- Treatment?

Rhythm Review





ETT Emergency Medications

- N
- A
- V
- E
- L

The END

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